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RONALD E. GREIGG
GREIGG & GREIGG P.L.L.C.
1423 POWHATAN STREET, UNIT ONE
ALEXANDRIA, VA 22314

EXAMINER	
MERKLING, MATTHEW J	

ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/509,058	ALBRODT ET AL.	
	Examiner	Art Unit	
	MATTHEW J. MERKLING	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 January 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *21-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 21-32, 34 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruoff et al. (WO 01/24294 with English language equivalent US 7,044,160) in view of Riple (US 4,208,871) and evidenced by Andrews et al. (US 6,821,660).

Regarding claims 21-24 and 40, Ruoff discloses a reforming system for a fuel cell, the system comprising:

an evaporating device (4, col. 4 lines 10-11) for evaporating a raw fuel and for delivering the evaporated raw fuel to a reforming unit (10),

a pump (21, see Fig. 2) for conducting fuel to the evaporating unit, and a valve (22) for precisely metering the raw fuel that is conducted into the evaporating device,

a control unit (24),

said pump (21) delivering raw fuel to a metering valve (22) so as to precisely meter the quantity of raw fuel which is delivered to the evaporating device (col. 5 lines 8-15); and

at least one monitoring device (28) serving to monitor the metered quantity of the raw fuel which passes through the metering valve (22, see Fig. 2).

Ruoff, however, fails to explicitly teach a metering pump conducting fuel to the evaporating device where there is no further control structure between the metering pump and the evaporating device.

In other words, as discussed above, Ruoff teaches an apparatus which uses a pump (21) to provide pressure to a fluid stream, and then uses a metering valve (22) to regulate the flow of a fluid to the evaporator (as discussed above).

Riple also discloses an apparatus for precisely metering a fluid flow (see abstract).

Riple teaches a boost pump (12) which operates in a similar way to the pump of Ruoff (pump 21). Riple, like Ruoff, uses this boost pump to provide a constant pressure (see col. 2 lines 61-63) upstream of a metering apparatus (14). Riple then uses a metering pump (14, which is controlled by controlling the rotating motor, ie. rpm, see col. 3 lines 7-16, and also which is electric, see Fig. 1) to regulate the flow of a fluid coming from the boost pump, to a target destination (col. 2 lines 13-17). This control strategy is similar to the one in Ruoff where a boost pump supplies a constant pressure to a metering apparatus which in turn meters the desired fluid flow rate to a desired destination. The main difference between these two control strategies is that Ruoff uses a metering valve to control the flow rate of fluid to the target destination, while Riple uses a metering pump to control the flow rate of fluid. However, using a metering valve or a metering pump to control fluid flow are often interchangeable, as is recognized in the art (see Andrews, col. 7 line 62 - col. 8 line 4 which discloses that metering pumps and metering valves can be viewed as equivalents).

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to replace the metering valve of Ruoff, with the metering pump of Riple, as such a modification would amount to nothing more than a simple substitution of one known element for another (as is evidenced by Andrews) to yield entirely predictable results.

Furthermore, it is also noted that while Ruoff seemingly teaches away from using a single metering pump to regulate flow to the evaporator, Ruoff does not teach away from using a combination of a boost pump and a metering pump.

Regarding limitations recited in claims 24 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP §2114 and 2115. Further, process limitations do not have a patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.

Regarding claims 25 and 26, Ruoff, as modified by Riple teaches an electric second pump (metering pump, as discussed above) as well as regulating the metering pump with a timing module (34 of Riple), but Ruoff is silent as to the drive mechanism of the first pump.

However, as set forth above, Riple teaches a similar fluid flow control strategy and discloses the use of an electric first pump (boost pump, col. 2 lines 56-61).

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the electric first pump of Riple, as the pump (21) of Ruoff, as such a modification would be nothing more than applying a known technique (electric power to drive a pump) to a known device (pump) ready for improvement to yield predictable results.

Regarding claim 27, Ruoff discloses the monitoring device is a pressure sensor (27), which measures the pressure in the evaporating device (outlet of the pump, col. 5 lines 22-30).

Regarding claim 28, 'the monitoring device monitors the current consumption of the at least one pump' is an operational condition and not a structural limitation. It is noted that apparatus claims cover what a device is, not what a device does. See MPEP 2114. The manner of operating the claimed apparatus is not a patentable distinction over the prior art apparatus, therefore the claims read upon Ruoff.

Regarding claim 29, Ruoff discloses the monitoring device is a flow sensor (28), which detects the flow out of the pump into the evaporating device (col. 5 lines 22-30).

Regarding claim 30, Ruoff, as modified by Riple, discloses the monitoring device is an rpm sensor, which measures the rpm of the at least one pump (col. 3 lines 18-23).

Regarding claims 31, Ruoff, as modified by Riple, discloses the metering quantity in a fuel pump in the reforming system, as discussed in claim 21, comprising the steps of ascertaining a variable with the monitoring device (pressure or flow rate, col. 5 lines 22-30), which variable serves as a controlled variable for the regulation, and utilizing an rpm sensor to determine the rpm of the fuel pump (col. 3 lines 18-23) as a controlling variable

for the regulation, the rpm being set by means of a timing module (rpm regulator, which is taught by Riple, as discussed above, is inherently a timing module, revolutions per minute).

Regarding claim 32, Ruoff discloses the step of ascertaining a variable comprises measuring the pressure with a pressure sensor (27), which pressure serves as a controlled variable for the regulation (col. 3 lines 18-23 and col. 5 lines 22-23).

Regarding claim 34, Ruoff discloses a method for regulating the metering quantity of a metering pump in a reforming system of claim 21, wherein the metering quantity (pressure or flow rate) serves as a controlled variable, and a characteristic delivery curve of the metering pump (rpm vs. controlled variable) is stored in memory in the control unit (24), which characteristic delivery curve indicates a set-point value for the metering quantity as a function of the rpm of the metering pump (inherent, as controller makes adjustments to rpm based on controlled variable, col. 3 lines 18-23) and varies the rpm as necessary to control the controlled variable.

3. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ruoff et al. (WO 01/24294 with English language equivalent US 7,044,160) and Riple (US 4,208,871) as applied to claim 31 above, and further in view of McArthur (US 6,209,309).

Regarding claim 33, Ruoff teaches utilizing an rpm sensor to determine the rpm of at least one metering pump (as discussed above) and comparing a characteristic curve (inherent by regulation of rpm with respect to outlet flow or pressure, as discussed above) to the load state (rpm) stored in memory (col. 2 lines 53-61). Ruoff, however, does not

explicitly disclose the pulse width ratio of the trigger signal of the timing module serves as a controlling variable, and varying the rpm as a controlled variable by way of the pulse width ratio of the trigger signal of the timing module.

McArthur teaches pulse width modulated fuel flow control to meter a fluid flow of a pump determined by timing periods that the valve is open during each cycle (col. 1 lines 10-20), and it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Ruoff with McArthur for the purpose to provide a fuel flow control that is low cost and an efficient method of fuel control (col. 1 lines 51-55).

4. Claims 35-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruoff et al. (WO 01/24294 with English language equivalent US 7,044,160) and Riple (US 4,208,871) as applied to claim 31 above and further in view of Escobar (US 5,780,729) as evidenced by Eberspach et al. (US 2002/0119408).

Regarding claims 35 and 39, Ruoff teaches a method for monitoring a metering pump (21) in a reforming system used in a motor vehicle (col. 1 lines 15-24), but does not explicitly disclose comprising outputting a warning signal by means of a drive-information system upon a deviation of a variable, ascertained by the monitoring device, from a set-point value.

Escobar teaches a fuel delivery system wherein a warning signal is issued when an error occurs in the fueling system for example flow metering 8 (measured by a flow sensor) (col. 6 lines 56-59), and it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Ruoff to include a warning signal

when error in operation of fueling system occurs for the obvious purpose to provide a warning to unsafe fueling conditions.

Regarding claim 36, the warning signal of Ruoff, as modified by Riple and Escobar, is output by the driver-information system if a monitoring device for monitoring the current consumption of the metering pump (8, Fig. 1) detects that a defined maximum or minimum current limit has been exceeded or undershot for longer than a defined length of time (col. 5 line 6 – col. 7 line 4).

Regarding claim 37, Ruoff in view of Riple and Escobar teach all of the limitations as applied to claim 35 above but is silent to wherein the a warning signal is output by a driver-information system if the rpm of the metering pump, measured by the rpm sensor, deviates from the set-point value. However such modification would merely be utilizing a value determining arrangement to sense the operating state based on rpm of pump as opposed to flow and would have been an obvious control variable modification to one of ordinary skill in the art at the time of the invention (See Eberspach et al., US Pub. 2002/0119408 at [0010]).

Regarding claim 38, Ruoff teaches all of the limitations as applied to claim 34, but does not explicitly teach outputting a warning signal by a driver-information system if the metering quantity measured by a flow sensor deviates from its set-point value. Escobar teaches a fuel delivery system wherein a warning signal is issued when an error occurs in the fueling system for example flow metering 8 (measured by a flow sensor) (col. 6 lines 56-59), and it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Ruoff to include a warning signal when error in

operation of fueling system occurs for the obvious purpose to provide a warning to unsafe fueling conditions.

Response to Arguments

5. Applicant's arguments filed 1/8/09 have been fully considered but they are not persuasive.

On pages 9 and 10, Applicant argues that Ruoff teaches away from using a metering pump by citing the passage in Ruoff (col. 6 lines 42-44) which states "However, what remains essential is that the pump 21 need no longer be configured as a metering pump because of the use of a metering pump 21 in combination with a metering valve." The examiner respectfully disagrees with this argument. As stated in the rejection above, it is recognized that Ruoff does not teach a second pump which is a metering pump. Instead, Ruoff teaches a metering valve in place of the metering pump. In other words, Ruoff teaches away from using pump 21 as a metering pump, but does not teach away from placing a metering pump in place of the metering valve. Riple teaches a very similar configuration to the one of Ruoff where a first pump supplies liquid to a metering device at a constant pressure. Riple teaches the use of a metering pump as the metering device instead of a metering valve. The examiner made the rejection based on a rational assessment of the prior art. Rejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness (*KSR*, 550 U.S. at___, 82 USPQ2d at 1396), See MPEP §2141(III). It is the examiner's position that it was recognized in the art at the time of the invention that a metering valve and a metering pump are both devices known to

be placed in the same service to achieve the same purpose (metering fluid flow), and exchanging the metering valve of Ruoff with the metering pump of Riple would have been obvious to one of ordinary skill in the art at the time of the invention.

On page 9, Applicant asks for clarification regarding the Andrews reference. Ruoff was not modified with any feature of Andrews. The sole purpose of Andrews being mentioned in the rejection was to provide evidence of the state of the art (metering valves and metering pumps are viewed as interchangeable).

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. MERKLING whose telephone number is (571)272-9813. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. J. M./
Examiner, Art Unit 1795

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795